

(USACE 1987). The velocities resulting from upstream freshwater flow conditions will not normally control the resuspension of bottom sediments (USACE 1987).

The Site is situated within five USACE defined navigation reaches, including Point No Point Reach, Harrison Reach, Newark Reach, Kearny Reach, and Arlington Reach (Figure 2-2). The Site is considered navigable by USACE (1987).

2.1.3 Climate

The information provided by USACE (1987) indicate that the climate for the Site and surrounding area is characteristic of the Middle Atlantic Seaboard, where marked changes in weather are frequent, particularly in the spring and fall. Winters are moderate with snowfall averaging approximately 34 inches annually from October through mid-April. Rainfall is moderate and distributed fairly uniformly throughout the year, averaging approximately 47 inches annually with an average of 121 rainy days per year, although the region may be influenced by seasonal tropical storms and hurricanes between June and November. Thunderstorm activity is most likely to occur in the summer, and northeasters from November to April. The average annual temperature in Newark is 54 degrees Fahrenheit (F); with extremes from -26 degrees F to +108 degrees F. Mean relative humidity varies from 67% to 73%. Prevailing winds in the Newark area are from the southwest, with only small seasonal variations in direction. The mean wind direction for the winter months is west-northwest (13 percent of the time), while southwest winds (12 percent of the time) predominate during the summer. Mean wind speeds are generally highest during the winter and spring months (10 to 12 miles per hour), and lower (8 to 9 miles per hour) during the summer months, with an average annual velocity of approximately 10 miles per hour.

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2.1.4 Land Use & Demographics

The Site has a long history of industrialization, dating back more than two centuries (Meyers 1945; Cunningham 1966a, 1966b; Brydon 1974). By 1850, Newark had a number of chemical companies producing a diverse range of chemical products and raw materials (Cunningham 1954; Zdepski 1992). By the turn of the century, Newark was the largest industrial-based city in the United States with well established industries such as petroleum refining, shipping, tanneries, creosote wood preservers, metal recyclers, and manufacturing of materials such as rubber, rope, textiles, paints and dyes, pharmaceutical, raw chemicals, leather, and paper products (Meyers 1945; Cunningham 1954; Cunningham 1966a; Brydon 1974; Halle 1984; MacRae's 1986; Galishoff 1988). Both World War I and World War II promoted further urban and industrial growth in the region (Squires 1981). Waterborne commerce also greatly expanded during the period between 1920 and 1950 (Squires 1981).

Land use along the lower Passaic River, extending south of the Dundee Dam and including the Site, is dominated by high-density commercial and industrial/commercial development. Almost all of the wetlands in the lower Passaic River have been eliminated, with more than 7,500 acres developed since 1940 (USACE 1987). The left bank of the Site (looking upstream) is almost fully developed, consisting of active or abandoned commercial and industrial/commercial properties with little or no access to the river. Active or abandoned industrial properties and rail lines completely dominate the right bank (looking upstream) of the Site for approximately five miles from the confluence with Newark Bay. The final mile is a mixture of industrial and commercial properties. A highly developed network of highways, CSOs, stormwater outfalls, and publicly owned treatment works (POTWs) exists throughout the area (Mueller et al. 1982).

2.1.5 Shoreline Features

Both shorelines of the Passaic River Study Area are almost completely developed, consisting of commercial and industrial properties. For the purposes of descriptions in this RIWP, the shoreline of the Passaic River will be defined as left and right shorelines as looking upstream. The thalweg of the river is generally in the center of the channel in straight sections and is observed to favor the outside bends of the meanders as expected. The Passaic River Study Area encompasses four complete and one partial USACE defined navigation reaches; the Point No Point, the Harrison, the Newark, the Kearny, and the Arlington Reaches. The Arlington Reach reflects the partial reach. For reference, Station 0+00 of the Passaic River Study Area corresponds approximately to USACE station designation 40+00 and Station 216+80 of the Passaic River Study Area corresponds approximately to USACE station designation 256+80.

Point No Point Reach

The Point No Point Reach, extends from the downstream river boundary (Station 0+00) to approximately Station 67+00 of the Passaic River Study Area. The Reach follows a north-south trend and is the deepest portion of the Passaic River Study Area. The only major natural inflow to the Reach is Lawyer's Creek, a small drainage that enters from the left bank approximately 3,000 feet from the upstream end of the Reach. The Reach contains three bridges including the abandoned Conrail Bridge that delineates the lower portion of the Passaic River Study Area, and the Lincoln Highway and the General Pulaski Skyway Bridges (U.S. Routes 1&9).

The USACE is responsible for delineating and maintaining navigation channels in the Passaic River. The Federal Project Limit (the extent of the channel to be maintained in the river) was originally adopted in 1907 and modified in 1911, 1912, 1930, and

provides for a channel 30 feet deep (relative to Mean Low Water [MLW]) and 300 feet wide in the Point No Point Reach (pers. com. John Bianco USACE-PRD).

The USACE last performed a hydrographic survey in 1989 to assess the conditions of the river. Water depths in the Point No Point Reach ranged from approximately 33.0 feet (MLW) at the downstream end to 21.1 feet (MLW) at the upstream end. The channel in the Point No Point Reach was last dredged in 1983 to the Project Depth of 30 feet. Previous dredgings in the period of interest (1940 to present) are reported in 1971, 1965, 1957, 1946, and 1940 (IT 1986).

The shorelines of the Reach consist primarily of wooden and stone bulkheads and are bordered by several industrial facilities. The right shoreline contains several large industrial facilities including Western Electric, BASF, SpectraServe and a former Monsanto manufacturing plant. The left shoreline consists of mostly wooden bulkheads and contains ship piers, several chemical and petrochemical manufacturing facilities (including Reichold Chemical, Sun Oil, Hoescht-Celanese), and the former Public Service Electric and Gas Company's (PSE&G) Essex Generating Station.

The Point No Point Reach contains one CSO. It is located on the left bank, at approximately Station 13+00 and for nomenclature purposes has been called Un-named 3. The CSO is one of four that drains the Newark CSO District.

Harrison Reach

The Harrison Reach extends from approximately Station 67+00 to Station 181+00 of the Passaic River Study Area. The Reach begins with a relatively straight section running east-west before entering a large meander near the end of the Reach. Frank's Creek enters the Reach from the right bank at approximately Station 120+00. Based on the hydrographic survey conducted by USACE in 1989, water depths in the Reach

ranged in depth from 21.1 feet (MLW) at the downstream end of the Reach to approximately 19.2 feet (MLW) at the upstream end. There appear to be areas of higher deposition on the inside bends of the meanders.

There are two bridges in the Harrison Reach, close together near the downstream end of the reach. Looking upstream, the first bridge is a ConRail (Penn Central) freight bridge and the second is the bridge for Interstate 95 (New Jersey Turnpike).

The USACE has delineated the Project Limits for the Reach as a 300 foot wide channel with a Project Depth of 20 feet (MLW). The only dredging event in the Harrison Reach within the period of interest (1940 to present) was performed in 1949. The dredging at that time was to the Project Depth of 20 feet.

The right shoreline consists primarily of gravel rip-rap and wooden or stone bulkheads bordered by a passenger train yard and a train servicing depot; the left shoreline consists of wooden bulkheads bordered by several chemical facilities (e.g., Benjamin Moore, Chemical Waste Management, Hilton-Davis, Sherwin-Williams) and inactive industrial properties (including Commercial Solvents, Diamond Shamrock). An abandoned marina is located at Blanchard Street between the abandoned Commercial Solvents site and the Benjamin Moore facility.

The Harrison Reach contains a total of six direct and three indirect CSO discharges into the Passaic River. The following direct CSOs drain the Newark CSO district in upstream order: Un-named 2 located at Station 95+00; Un-named 1 located at Station 106+00; Newark located at Station 122+00. The Worthington Avenue CSO is located at Station 141+00 on the right bank; the Freeman Street CSO is located at Station 159+00 and the Polk Street CSO is located at Station 176+00. All direct CSOs with the exception of Worthington Avenue are on the left bank. The three indirect CSO discharges are located on Franks Creek upstream from the confluence with the Passaic